

## SITE INFORMATION

Revised 12/17/97

Current Site Name: North Liberty  
Location: North Liberty, IA  
Site Number: 56  
Geographic Region: North America  
Tectonic Plate: North American

General Site Description: The NRAO VLBA station is located in east central Iowa approximately three miles north of the town of North Liberty, and 20 miles south of Cedar Rapids. The site is also home to a permanent GPS receiver.

Local Geology: Not available at this time

Site Topo Map: USGS 1:100,000 Sheet 4109-F5-CF-100

## CONTACT INFORMATION

Site Ownership: USA (National Science Foundation)  
Site Management: National Radio Astronomy Observatory (NRAO) through Associated Universities Incorporated

Scheduling: Barry Clark  
Address: NRAO/AOC  
P.O. Box O  
Socorro, NM 87801  
Telephone: 505 835 7268  
Fax: 505 835 7027  
E- mail: bclark@nrao.edu

Contact Person: Jack Meadows  
Address: NRAO North Liberty VLBA Station  
P.O. Box 9  
North Liberty, IA 52317-0009  
Telephone: 319 626 6878  
Fax: 319 354 4632  
E- mail: vlbanl@nrao.edu

# MONUMENT INFORMATION

Revised 12/17/97

Current Site Name: North Liberty  
Location: North Liberty, IA  
Site Number: 56  
Number of Observing Monuments: 2  
Surveyed into National Network? Yes

Monument Number: 7612  
Type of Monument: Intersection of Azimuth and Elevation Axes  
Monument Inscription: None  
Systems using Monument: 25-Meter VLBA

Latitude: N 41° 46' 17.12930"  
Longitude: W 91° 34' 26.89110"  
Elevation: 255.730 meters  
Height above Ellipsoid: 222.302 meters  
Geodetic Coordinate Source/Date: ATSC / 15-DEC-97  
Geodetic Coordinate Datum/Ellipsoid: IERS ITRF94 (1993)  
Elevation Datum: NGVD 1929

Source of Monument Geodetic Survey Ties: ATSC  
Comments: None

## Differential Coordinates

Monument Number	Monument Inscription	X	Y	Z
4007	(4007-S)	-62.2278	25.3872	3.6259
---	NORTH LIBERTY 1987 (NGS)	-40.1533	58.403	37.6966
---	VLBA RM 1	35.6968	4.8871	-14.6017
---	VLBA RM 2	-34.3507	-0.9283	-24.8752
---	VLBA RM 3	-37.4668	34.8283	15.1854

Monument Number	Monument Inscription	North	East	Up
4007	(4007-S)	18.4706	-62.9020	-15.2358
---	NORTH LIBERTY 1987 (NGS)	66.2712	-41.7430	-17.6060

# MONUMENT INFORMATION

Revised 12/17/97

Current Site Name: North Liberty  
Location: North Liberty, IA  
Site Number: 56  
Monument Number: 7612

Monument Description: The station is located in east central Iowa approximately 3 miles north of the town of North Liberty, and 20 miles south of Cedar Rapids, on the NRAO North Liberty VLBA station site.

The station mark is a point represented by the perpendicular intersection of a plane through the elevation axis with the azimuth axis of the VLBA (Very Long Baseline Array) antenna. The point is not accessible and cannot be occupied. No survey disk or mark designates the point. It should be noted that the antenna elevation axis is offset by 2.133 meters (7 feet) from the azimuth axis.

Reference mark 1 is a punchmark in the rounded top of a 0.012 meter diameter stainless steel rod set 0.10 meters below the ground. It is set in concrete within a 0.13 meter diameter pvc pipe topped by an aluminum logo cover that is stamped **"NORTH LIBERTY VLBA RM 1 AUG 1992"**. It is set 7.95 meters southwest of the northwest corner of a 1 story, corrugated metal building; 5.56 meters west of the west side of the corrugated building; and 6 meters north of the centerline of the site's driveway. It is located 36.2 meters at a geodetic azimuth of 101 degrees from SGP Station 7612.

Reference mark 2 is a standard 3-d mark. it is a punchmark in the rounded top of a 0.012 meter diameter stainless steel rod set 0.08 meters below the ground. it is inside a 0.13 meter diameter pvc pipe topped by an aluminum logo cover stamped **"NORTH LIBERTY VLBA RM 2 AUG 1992"**. In setting the mark, the rod was driven 16 feet to refusal. It is set approximately 8 meters north of the southern most fenceline of the 8' high chain link fence surrounding the vlba site; 6.60 meters southwest of a steel, triangular weather tower/station; and 8.77 meters south of a raingauge. It is located 39.6 meters at a geodetic azimuth of 240 degrees from SGP Station 7612.

Reference mark 3 is a standard 3-d mark. it is a punchmark in the rounded top of a 0.012 meter diameter stainless steel rod set 0.05 meters below the ground. It is inside a 0.13 meter diameter pvc pipe topped by an aluminum logo cover that is stamped **"NORTH LIBERTY VLBA RM 3 AUG 1992"**. In setting the mark, the rod was driven 30 feet to refusal. It is set 11.5 meters southwest of the northwest corner of the 8' high chain link fence surrounding the vlba site; 4.5 meters south of the northern most fenceline; and 9 meters east of the western most fenceline. It is located 51.2 meters at a geodetic azimuth of 311 degrees from SGP Station 7612.

Additional marks are in the vicinity of the VLBA antenna.

# MONUMENT INFORMATION

Revised 12/17/97

Current Site Name: North Liberty  
Location: North Liberty, IA  
Site Number: 56

Monument Number: 4007  
Type of Monument: 0.455 Meter Diameter Stainless Steel Plate  
Monument Inscription: North Liberty-VLBA GPS STATION MARK-  
JPL 4007-S 1992  
Systems using Monument: GPS

Latitude: N 41° 46' 17.72780"  
Longitude: W 91° 34' 29.61034"  
Elevation: 240.490 meters  
Height above Ellipsoid: 206.970 meters  
Geodetic Coordinate Source/Date: BFEC / 18-DEC-92  
Geodetic Coordinate Datum/Ellipsoid: ITRF-89  
Elevation Datum: NGVD 1929

Source of Monument Geodetic Survey Ties: ATSC

Comments: None

## Differential Coordinates

Monument Number	Monument Inscription	X	Y	Z
---	NORTH LIBERTY 1987 (NGS)	22.0745	33.0166	34.0707

Monument Number	Monument Inscription	North	East	Up
---	NORTH LIBERTY 1987 (NGS)	47.8003	21.1589	-2.3701

# MONUMENT INFORMATION

Revised 12/17/97

Current Site Name: North Liberty  
Location: North Liberty, IA  
Site Number: 56  
Monument Number: **JPL 4007 S 1992**

Monument Description: **"JPL 4007 S 1992"** is a 0.455 meter diameter stainless steel plate set flush in the center of a 0.610 meter diameter concrete monolith that projects 0.465 meters above the ground. The steel plate is engraved **"NORTH LIBERTY - VLBA GPS STATION MARK JPL 4007 S 1992 NASA FLINN SITE NORTH AMERICAN HIGH PRECISION FIDUCIAL NETWORK BLEWITT AND CLARK SPACE - GEODETIC PIONEERS JPL/GSFC COLLABORATION"**. It is set approximately 26 meters south-west of the northwest corner of the chain link fence that surrounds the vlba site; and 12.98 meters west of the western most fenceline. It is located 65.6 meters at a geodetic azimuth of 286 degrees from SGP Station 7612.

**"NORTH LIBERTY"** is a standard brass National Geodetic Survey horizontal control disk set flush in the center of a 0.310 meter diameter concrete monument that is flush with the ground. The disk is stamped **"NORTH LIBERTY 1987"**. It is set 25.02 meters at a magnetic azimuth of 5 (five) degrees from the northwest corner of the chain link fence. it is located 78.3 meters at a geodetic azimuth of 328 degrees from SGP Station 7612.

**"NORTH LIBERTY NO 1"** is a standard brass National Geodetic Survey reference mark disk set flush in the center of a 0.26 meter diameter concrete monument that is flush with the ground. The disk is stamped **"NORTH LIBERTY NO 1 1987"**. It is located at a geodetic azimuth of 7 (seven) degrees and a distance of 15.1 meters from monument **"NORTH LIBERTY 1987"**.

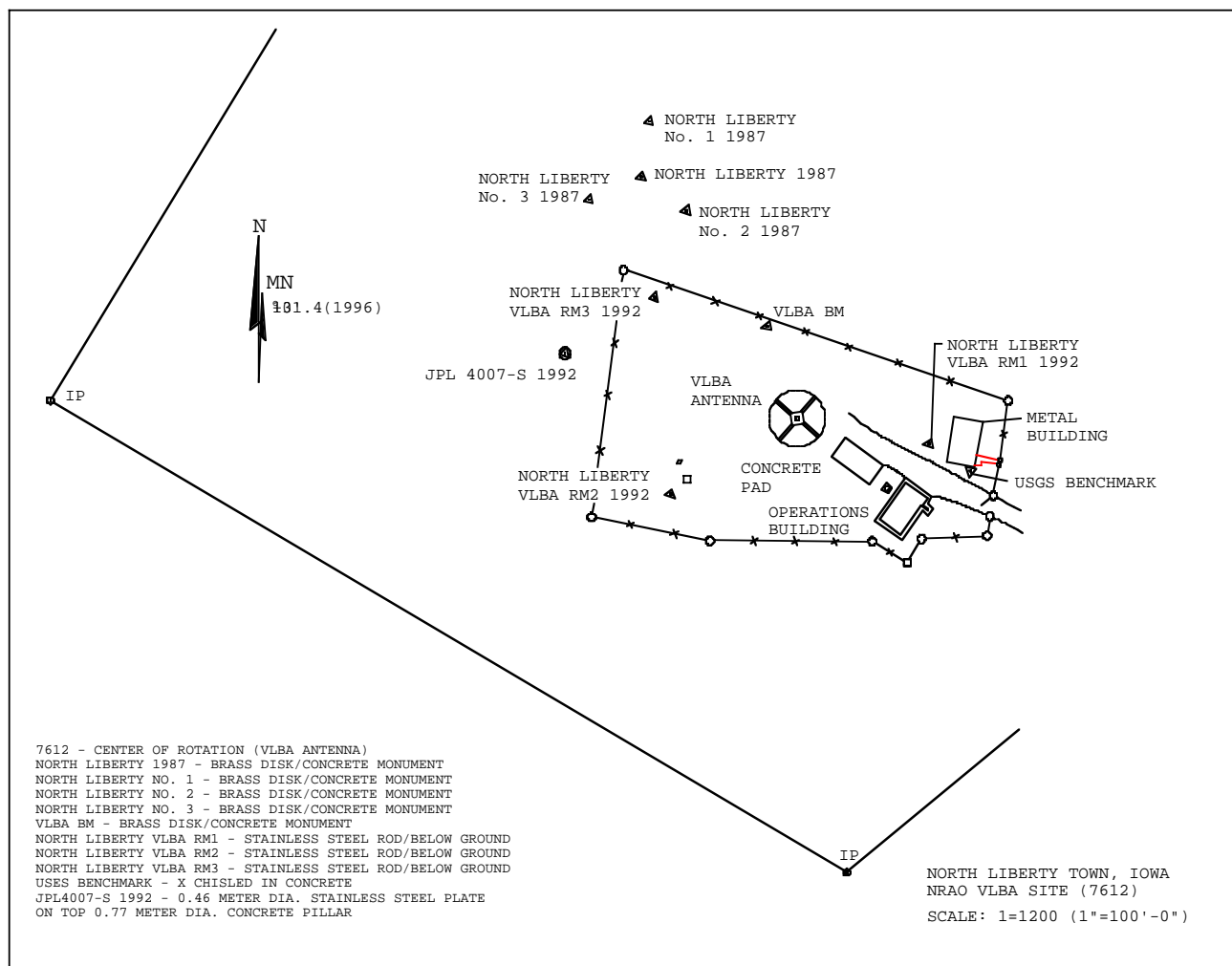
**"NORTH LIBERTY NO 2"** is a standard brass National Geodetic Survey reference mark disk set flush in the center of a 0.26 meter diameter concrete monument that is flush with the ground. the Disk is stamped **"NORTH LIBERTY NO 2 1987"**. It is located at a geodetic azimuth of 127 degrees a distance of 15.2 meters from monument **"NORTH LIBERTY 1987"**.

**"NORTH LIBERTY NO 3"** is a standard brass National Geodetic Survey reference mark disk set flush in the center of a 0.26 meter diameter concrete monument that is flush with the ground. The disk is stamped **"NORTH LIBERTY NO 3 1987"**. It is located at a geodetic azimuth of 247 degrees a distance of 15.3 meters from monument **"NORTH LIBERTY 1987"**.

# SITE SKETCH

Revised 12/17/97

Current Site Name: North Liberty  
Location: North Liberty, IA  
Site Number: 56



# OCCUPATION HISTORY

Revised 12/17/97

Current Site Name: North Liberty  
Location: North Liberty, IA  
Site Number: 56

## SLR Occupations

Monument Number	Occupying System	Occupation Designator	Starting Date	Ending Date
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No Previous Occupations

## VLBI Occupations

Monument Number	Occupying System	Occupation Designator	Starting Date	Ending Date
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7612	VLBA	76129701	01-Jan-90	-----
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## GPS Occupations

Monument Name	Starting Date	Ending Date	Network
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NLIB	05-Mar-93	-----	IGS
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## Footprint Surveys

Survey	Starting Date	Source
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No footprint surveys were completed. See the station description notes for geodetic ties to other local geodetic stations.